

SOUTHWEST RESEARCH INSTITUTE  
Department of Quality Assurance  
Calibration Laboratory • 522-5215

WORK ORDER

CERTIFICATE # 33566 ASSET # 007167 DATE 19 MAR 99

ITEM DATA:

Manufacturer Fisherbrand Model 15-166  
Description Thermometer Serial # A98182  
Accessories Tube

ACTION REQUESTED 01

CUSTODIAN D. L. Dunn

Turned in by: \_\_\_\_\_ Phone 6040

CHARGE # 20. 448-591-04 03/12 Date Required \_\_\_\_\_

INSTRUMENT USED ON: ☐ (DOD/NASA) ☒ (NUCLEAR) ☐ (GLP) ☐ (SPPE) ☐ (ISO)  
☐ OTHER \_\_\_\_\_

COPY OF CALIBRATION CERTIFICATE ☒ (Yes) ☐ (No)

NEW WORK ☐ Yes ☒ No If yes, an evaluation shall be made to verify capabilities.

By MM Date 03-05-99

Work involves proprietary/confidential information or equipment ☐ (Yes) ☒ (No)

CONDITION RECEIVED: \_\_\_\_\_ (F) Out of tolerance, repaired to specifications  
\_\_\_\_\_ (G) In tolerance, minor adjustments/repairs made  
☒ (J) In tolerance, no adjustments/repairs  
\_\_\_\_\_ (K) Out of tolerance, adjusted to specifications  
\_\_\_\_\_ (S) Received into system, introduced or reactivated

ACTION TAKEN: (Calibration/Repair/Parts) 6 Point Cal

CAL ENVIRONMENT:

Temperature 74°F Humidity 49 %RH

CALIBRATED/REPAIRED:

By MM

Date 3-17-99

Cal Interval 12 mo

Next Cal due 3-17-00

Standards used (Asset#) 000219

Cal Procedure T033K5-4-42-1 ARR97

Accuracy ± 1.0 °C

Reliability Code: \_\_\_\_\_

Cal Time 1h Repair Time \_\_\_\_\_

DATE COMPLETED 3-17-99

DATE PICKED UP 3/18/99

PICKED UP BY [Signature]

33566

## CALIBRATION CHECK FORM

Date Calibrated 3-16-99

Work Order 333 6 6

Rev \_\_\_\_\_ Ch\_\_\_\_\_

Technikler MW

Page \_\_\_\_\_ of \_\_\_\_\_

Unit Under Test Thermometer

Manufacturer Fisher

Model 15-166A

SN H98-182 ASN 7167

[illegible]

# WORK ORDER 38586

Date Received 4/10/00

Asset No. 007167 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Description THERMOMETER

Serial Number H98-182

Accessory Received/Required CONTAINER

Div/CC ID NONE

Accessory to Asset No.

N/A

Accuracy

Mfg. Tol.

Div/CC DIV20

Location

B57

Custodian

DARRELL DUNN

Tel. 6090

Charge/Project No. 20.00751.006

Proprietary/Confidential

N

Date Required

ROUTINE

Work Requested CALIBRATION

Receiving Inspection O.K.

Delivered By DARRELL DUNN

Tel. 6090

## WORK HISTORY

Date	Start Time	Stop Time	Notes

SwRI Cal-Lab By  
CAL: 03/17/99 DUE: 03/1  
AN: 007167 SN: H98-182  
I hereby certify that this work was done

## PARTS

Part Name	Part Number	Cost	Failure Description

## WORK SUMMARY

Failure Description

Repair Action

Cal Procedure

CL-9 5799

Temp

76

F

Hum

48

%

Tech

*[Signature]*

Cal Hrs.

1

Repair Hrs.

Part Cost

Action Taken

*Cal*

Standards Used

0219 5774

Date Cal

4-18-00

Int. 12

Mo.

Date Due

4-18-01

Reliability Code

2

Date Picked Up

5/2/00

Picked Up By

*[Signature]*

38586



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory

Accredited



Certificate #  
0972-01

## Certificate of Calibration

18 April 2000

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** H98-182  
**Asset Number:** 007167

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 76.0 Degrees Fahrenheit Humidity: 48 % RH

**Calibration Date:** 18 Apr 00 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** IN TOLERANCE

**Condition as Released:** IN TOLERANCE

**Remarks:**

Approved by:

Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 38586

m:\a2la.rpt Rev date 14 Dec 99

Measurements performed by:

Mack Wood, Technician

Page 1 of 1

# CALIBRATION CHECK FORM

Date Calibrated 4-18-00

Work Order 38586

Cal By [Signature]

Procedure No./Date CL-9 5/99 Unit Under Test ASTM 1C Thermometer

Mfg. Fisher Model 15-166A SN H98-182 AN 7167

[illegible]

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Processed by RCRUZ at 2:38:38PM on 4/26/01

1 10000 10000 10000 10000 10000 10000

Work Order **444043345**

Arrived **4/26/01**

Asset No. **007167** Manufacturer **FISHER SCIENTIFIC**

Model **15-166A**

Instrument Type/Class **THERMOMETER**

Serial No. **H98-182**

Accessory No. Calibration Procedure **CL-9 5/99**

Location **B57**

Div/Client **DIV20**

Custodian **DARRELL DUNN**

Mail Stop **B57**

Tel. **6090**

Charge/Project No. **20.00751.006**

Delivered By / Telephone **DARRELL DUNN**

**IN4CAL**

Special Instructions \_\_\_\_\_

### WORK NOTES

Date	Hours	Remarks/Notes
<u>5-1-01</u>	<u>1.0</u>	<u>Calibration</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

### REPAIR PARTS

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>N/A</u>	<u>→</u>	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description None

Repair Action None

Calibration Procedure CL-9 5/99 Temp 72 F Hum. 42 %

Tech R Dykeman Totals Cal Hours \_\_\_\_\_ Repair Hours \_\_\_\_\_ Parts Cost \_\_\_\_\_

Standards Used 5174, 5243

Date Picked Up 5/2/01

Picked Up By [Signature]

43345

## Calibration Data Sheet

[illegible]

To: rdykstra@qacal@swri30  
From: "Darrell Dunn" <ddunn@swri.edu>  
Cc:  
Subject: RE: Thermometers  
Attachment: Headers.822  
Date: 5/1/01 11:59 AM

+/- 1 degree is sufficient for our needs. I see no reason to change what we have done in the past.

-----Original Message-----

From: rdykstra@swri.edu (mailto:rdykstra@swri.edu)  
Sent: Tuesday, May 01, 2001 10:51 AM  
To: ddunn@swri.edu  
Cc: WHill@swri.edu  
Subject: Thermometers

Darrel, you have 11 Partial-Immersion thermometers in for calibration.

In the past they have been calibrated with an accuracy of +/- 1 Deg C. (Range is -20 to 150 Deg C). Is this accuracy sufficient for your needs?

The reason I am asking is the thermometers are labelled as ASTM 1C thermometers and according to the ASTM the scale error accuracy is +/- 0.5 Deg C.

I do not have all the data collected as of now. I will tell you so far all meet the +/- 1 deg C, not all are meeting the +/- 0.5 deg C spec.

The asset numbers are as follows: 007164, 005434, 007167, 007165, 007169, 005432, 007166, 007168, 003242, 005433, and 007171.

Let me know what accuracy will fit your needs.

Roger Dykstra  
Cal Lab. X5076



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory



Certificate #  
0972-01

## Certificate of Calibration

2 May 2001

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** H98-182  
**Asset Number:** 007167  
**Work Order Number:** 444043345

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

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The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 72.0 Degrees Fahrenheit Humidity: 42 % RH

**Calibration Date:** 1 May 01 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** IN TOLERANCE

**Condition as Released:** IN TOLERANCE

**Remarks:**

**Approved by:**

Walt Hill, Supervisor  
Institute Calibration Laboratory

**Measurements performed by:**

Roger Dykstra, Technician

# SOUTHWEST RESEARCH INSTITUTE

## Calibration Laboratory

### WORK ORDER

Received by RCRUZ, 5/9/02 9:18:19AM

1 00000 0000 0000 0000 0000 0000 0000

Arrived 5/9/02

Work Order

**444048465**

Asset No. 007167 Manufacturer FISHER SCIENTIFIC

Model 15-166A

Equipment Type THERMOMETER

Serial No. H98-182

Accessory No.

Interval 12 M

Calibration Procedure CL-9 5/99

Location B57

Div/Client DIV20

Custodian DARRELL DUNN

Mail Stop B57

Tel 6090

**IN LINE**

Special Instructions \_\_\_\_\_

Notify before adjustments or repairs. ( ) Provide data with certificate (✓) Certificate Type \_\_\_\_\_

Charge/Project No. 00751.006 1.20

Requester / Telephone

This information is correct for the work requested.

### WORK NOTES

Date	Hours	Remarks/Notes
<u>5/9/02</u>	<u>1.0</u>	<u>Cal</u>
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Date	Hours	Part Name	Part Number	Failure Description	Cost
<u>n/a</u>	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____
_____	_____	_____	_____	_____	_____

### WORK SUMMARY

Failure Description n/a

Repair Action n/a

Tech R Dykstra Cal Hrs. 1.0 Repair Hrs. \_\_\_\_\_ Parts Cost \_\_\_\_\_ Temp 74 F Hum. 55 %

Standards Used 5243 due 12/3/02

5174 due 3/18/03

Date Picked Up 6/6/2002

Picked Up By Darrell Dunn

48465

Southwest Research Institute  
Calibration Laboratory  
Calibration Data Sheet

Workorder 444048465

Asset #: 007167

Serial #: H98-182

Mfr. Fisher Scientific

Model 15-166A

Type Thermometer

Technician R Dykstra

Procedure CL-9, 5/99

Cal Date 5/9/02

**Ambient Conditions:**

Temperature	74	Degree F
Humidity	55	% R.H.
Baro. Pressure	N/A	PSIA

**Data sheet Revision:**

Revision 0 2/21/02

**Standards used:**

<b>Asset #</b>	<b>Due Date</b>	<b>Nomenclature</b>
005243	12/03/02	H.P. 34420A Digital Multi-Meter
005174	02/18/03	RTD probe

Is statement of compliance to a specification requested.  
(If statement is required, print yes otherwise leave blank)

Yes

Tolerance 1.00 Degree C Range -20 to 150 Degree C  
(If not required leave blank)

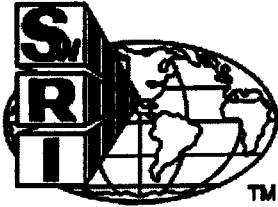
Degree C	Degree C	Degree C	Degree C	Degree C	
	As Found				
Std Reading	TI Reading	Error	Test Limits	Uncertainty	Results
-19.89	-20.2	-0.31	1	0.35	Pass
0.10	0.0	-0.10	1	0.35	Pass
50.00	50.4	0.40	1	0.35	Pass
99.94	100.0	0.06	1	0.35	Pass
149.90	149.0	-0.90	1	0.35	

**Remarks:**

The reported uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, which provides a level of confidence of approximately 95%.

If compliance testing to a specification is requested. The results can be pass, fail, or if blank "Not determinable". If results are not determinable it is to end user to determine if results meet thier needs.

If compliance testing to a specification is not requested, only data and uncertainty will be given on data sheet.



Southwest Research Institute  
6220 Culebra Road  
San Antonio, TX 78238  
(210) 522-5215  
Department of Quality Assurance  
Calibration Laboratory

## Certificate of Calibration

10 May 2002

**Issued to:** DARRELL DUNN DIV20 B57  
**Manufacturer/Model:** FISHER SCIENTIFIC 15-166A  
**Description:** THERMOMETER  
**Serial Number:** H98-182  
**Asset Number:** 007167  
**Work Order Number:** 444048465

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The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

**Ambient Conditions:** Temperature: 74.0 Degrees Fahrenheit Humidity: 55 % RH

**Calibration Date:** 10 May 02 **Calibration Procedure:** CL-9 5/99

**Condition as Received:** SEE ATTACHED DATA

**Condition as Returned:** SEE ATTACHED DATA

**Remarks:**

**Approved by:**

  
Walt Hill, Metrology Group Leader  
Institute Calibration Laboratory

**Measurements performed by:**

  
Roger Dykstra, Technician